

ABSTRACT

DISSERTATION: A Domain-Specific Modeling Approach for Component-Based Software Development

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This study has presented a component-based domain modeling approach that provides an environment for simplifying and accelerating software development and analysis, and improves software reusability, maintainability, and productivity. With high-level design abstraction, constraints of application domains, and the guidance of domain rules, the proposed component-based framework offers an effective solution to modeling and automating the development and deployment of software application. Meta-modeling will be used in this study to define the domain notations, rules, and constraints for component composition within a specific domain context. A domain-specific graphical design environment will also be proposed to simplify and accelerate the software development by simply dragging and dropping pre-built components with minimal programming effort. The modeling of components can be further extended with the specification of their dependability and real-time constraints.